US 20170092138A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2017/0092138 A1**

Trundle et al. (43) **Pub. Date: Mar. 30, 2017**

(54) **DRONE DETECTION SYSTEMS**

(71) Applicant: **Alarm.com Incorporated**, Tysons, VA (US)

(72) Inventors: **Stephen Scott Trundle**, Falls Church, VA (US); **Alison Jane Slavin**, Falls Church, VA (US)

(21) Appl. No.: **15/282,216**

(22) Filed: **Sep. 30, 2016**

Related U.S. Application Data

(60) Provisional application No. 62/235,042, filed on Sep. 30, 2015.

Publication Classification

(51) **Int. Cl.**

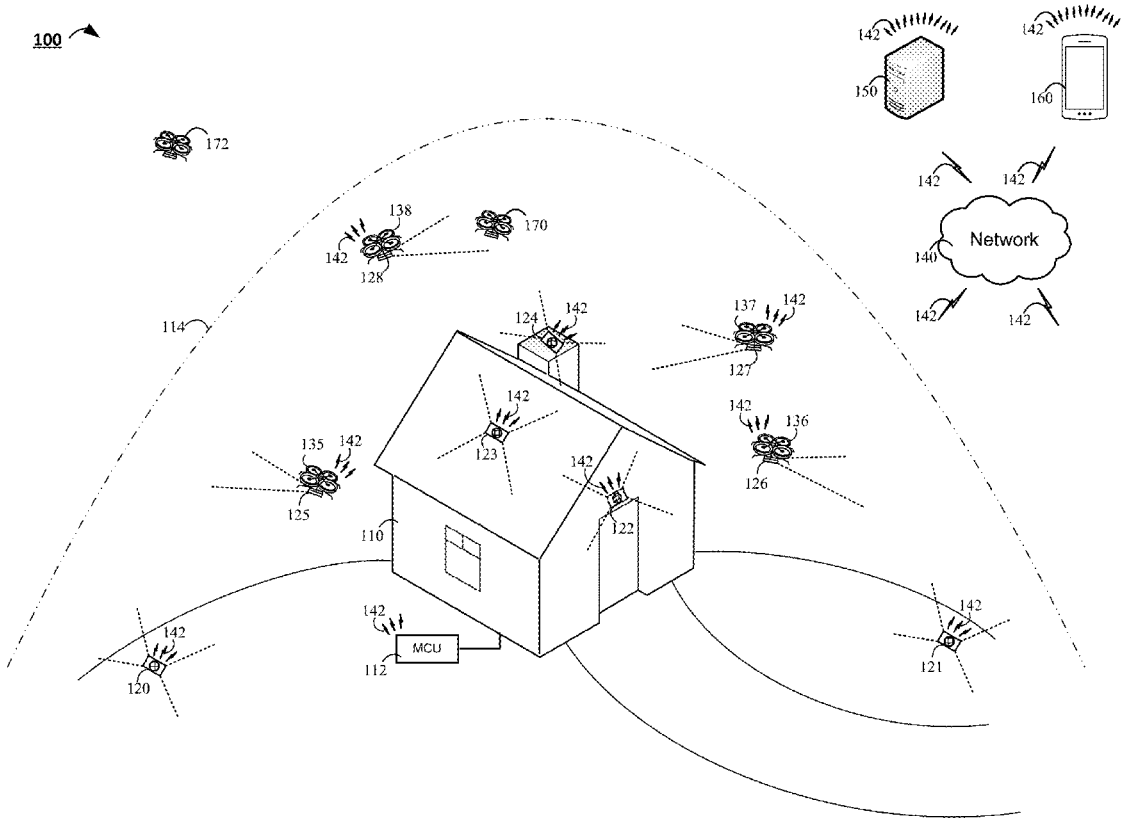
G08G 5/00	(2006.01)
G08B 25/14	(2006.01)
B64C 39/02	(2006.01)
H04W 4/02	(2006.01)

(52) **U.S. Cl.**

CPC ***G08G 5/0082*** (2013.01); ***H04W 4/021*** (2013.01); ***G08G 5/0069*** (2013.01); ***G08G 5/006*** (2013.01); ***G08B 25/14*** (2013.01); ***B64C 39/024*** (2013.01)

(57) **ABSTRACT**

Methods, systems, and apparatus, including computer programs encoded on storage devices, for drone-augmented emergency response services. In one aspect, a device includes a network interface, one or more sensors, one or more processors, and one or more storage devices that include instructions that are operable to perform operations. The operations include monitoring a predetermined geographic area that surrounds a particular property, determining that a drone device is within the predetermined geographic area that surrounds the particular property, determining whether the drone device that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device, and in response to determining that the drone device that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device, transmitting a signal indicating the detection of the unauthorized drone device within the predetermined geographic area that surrounds the property.



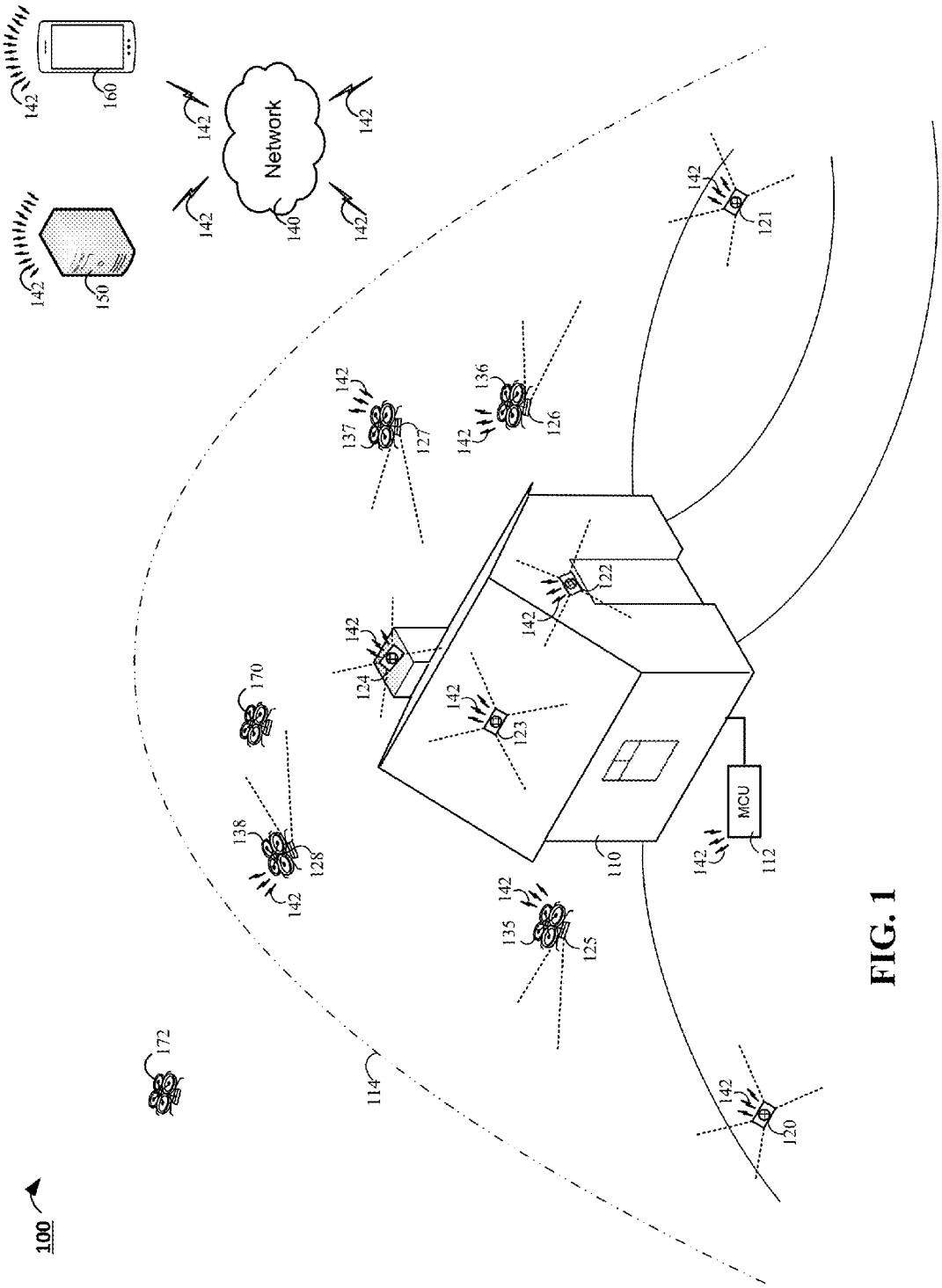

100
Network
MCU
110
112
114
120
121
122
123
124
125
126
127
128
135
136
137
138
140
142
150
160
170
172

FIG. 1

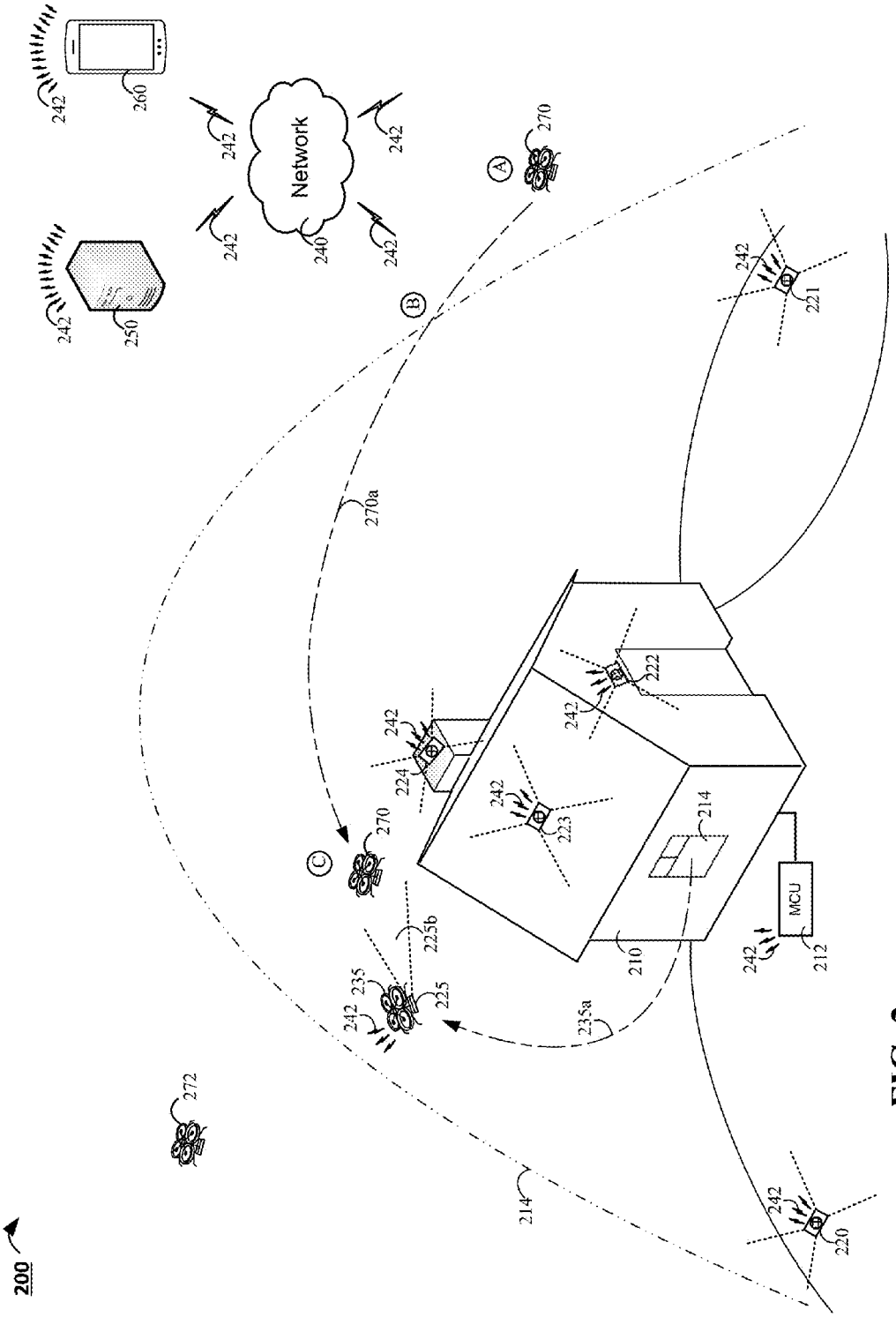

200
Network
240
242
250
260
270
270a
272
214
210
212
220
221
222
223
224
225
225b
235
235a
MCU
A
B
C

FIG. 2

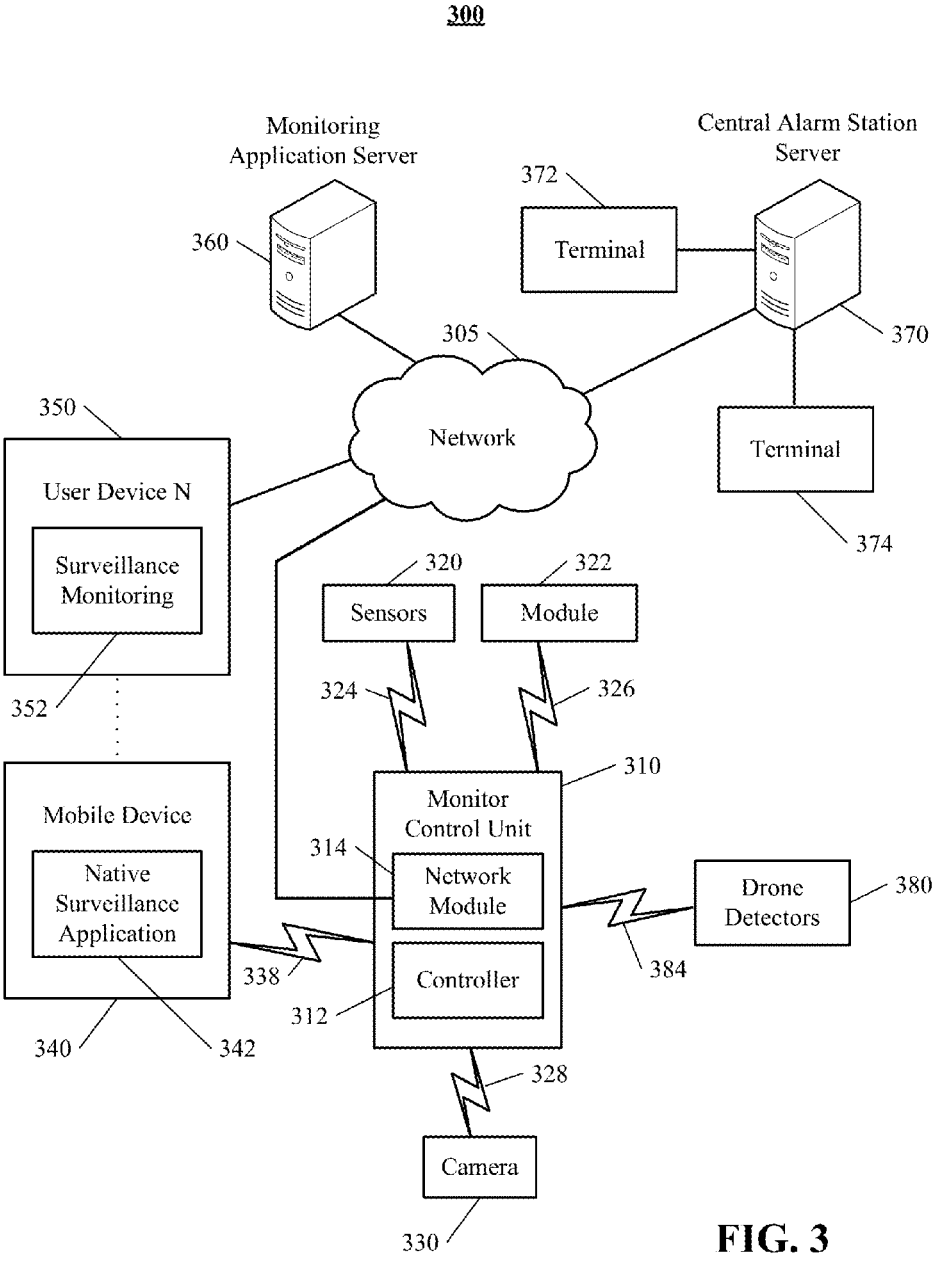

300
Monitoring Application Server
360
372
Terminal
Central Alarm Station Server
370
305
Network
350
User Device N
Surveillance Monitoring
352
Terminal
374
320
Sensors
322
Module
324
326
310
Monitor Control Unit
314
Network Module
Drone Detectors
380
384
338
Controller
312
Mobile Device
Native Surveillance Application
340
342
328
Camera
330

FIG. 3

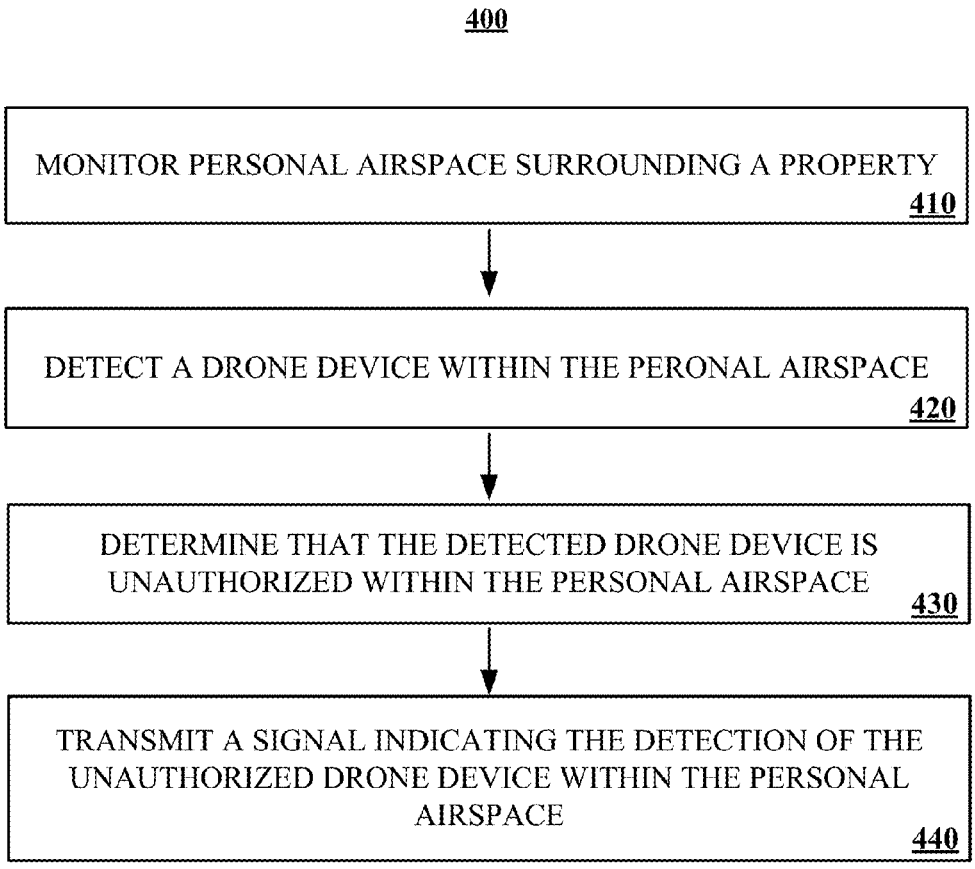

400
MONITOR PERSONAL AIRSPACE SURROUNDING A PROPERTY
410
DETECT A DRONE DEVICE WITHIN THE PERONAL AIRSPACE
420
DETERMINE THAT THE DETECTED DRONE DEVICE IS UNAUTHORIZED WITHIN THE PERSONAL AIRSPACE
430
TRANSMIT A SIGNAL INDICATING THE DETECTION OF THE UNAUTHORIZED DRONE DEVICE WITHIN THE PERSONAL AIRSPACE
440

FIG. 4

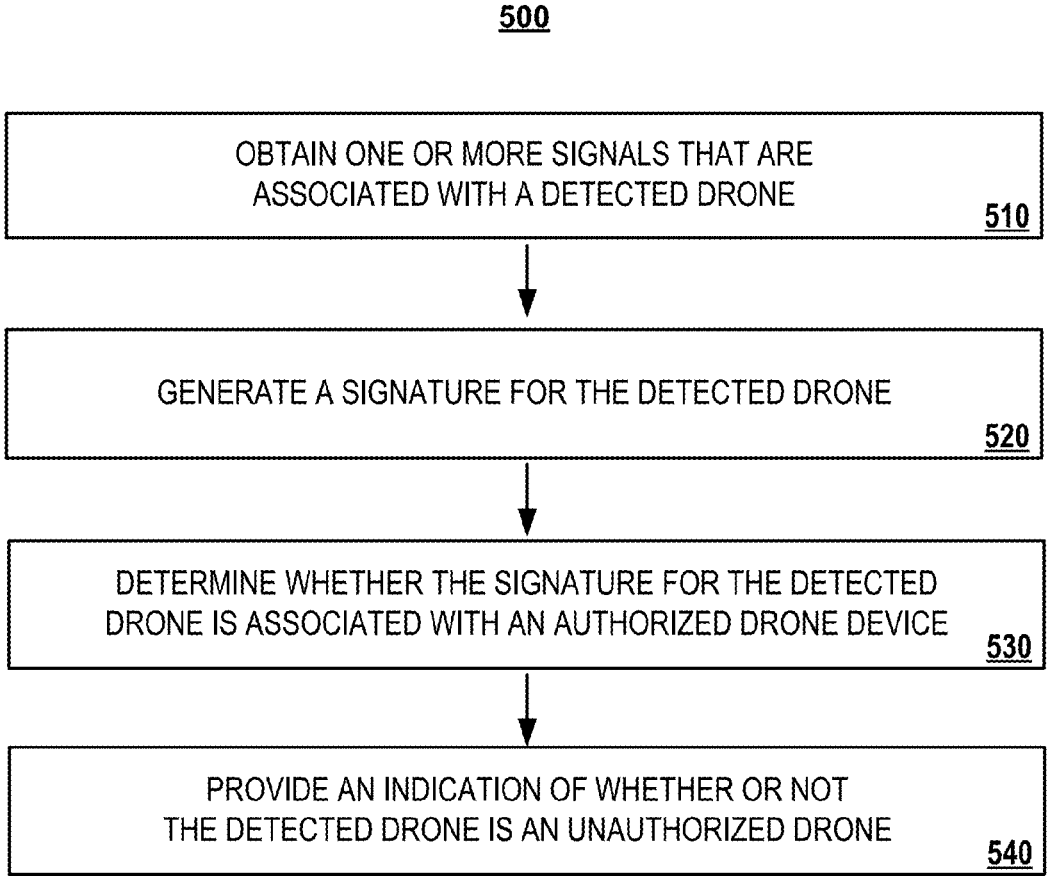

500
OBTAIN ONE OR MORE SIGNALS THAT ARE ASSOCIATED WITH A DETECTED DRONE
510
GENERATE A SIGNATURE FOR THE DETECTED DRONE
520
DETERMINE WHETHER THE SIGNATURE FOR THE DETECTED DRONE IS ASSOCIATED WITH AN AUTHORIZED DRONE DEVICE
530
PROVIDE AN INDICATION OF WHETHER OR NOT THE DETECTED DRONE IS AN UNAUTHORIZED DRONE
540

FIG. 5

DRONE DETECTION SYSTEMS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of the U.S. Provisional Patent Application No. 62/235,042 filed Sep. 30, 2015 and entitled "Drone Detection Systems," which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] This disclosure relates to monitoring technology and drone device detection.

BACKGROUND

[0003] Unmanned aerial vehicles (UAVs) such as drone devices often pose public safety and privacy concerns to users when the drone devices are used to collect unauthorized aerial surveillance without consent. For example, drone devices may be used to remotely capture video footage in areas within a property where a property owner expects privacy.

SUMMARY

[0004] Techniques are described for a drone detection system that uses one or more drone detectors to detect the presence of a drone within a predetermined geographic area surrounding a particular property.

[0005] According to at least one aspect of the subject matter described by this specification, a method, system, and apparatus, including computer programs encoded on storage devices are disclosed for implementing the drone detection system. In some aspects, a device may include a network interface, one or more sensors, one or more processors, and one or more storage devices that include instructions that are operable, when executed by the one or more processors, to cause the one or more processors to perform operations. The operations may include monitoring a predetermined geographic area that surrounds a particular property, determining that a drone device is within the predetermined geographic area that surrounds the particular property, determining whether the drone device that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device, and in response to determining that the drone device that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device, transmitting a signal indicating the detection of the unauthorized drone device within the predetermined geographic area that surrounds the property.

[0006] These and other versions each may optionally include one or more of the following features. For instance, the predetermined geographic area that surrounds a particular property may include the airspace that surrounds the property. Alternatively, or in addition, the predetermined geographic area that surrounds the particular property may include a geographic area that spans a predetermined threshold distance from the particular property.

[0007] In some aspects, monitoring a predetermined geographic area that surrounds a particular property may include capturing sensor data that is output from at least one of the one or more sensors.

[0008] In some aspects, determining that a drone device is within the predetermined geographic area that surrounds the particular property may include determining, based on the detection of first data that includes one or more sensor signals, that a drone device is within the predetermined geographic area that surrounds the particular property, wherein the one or more sensor signals include (i) audio signals from a propeller of the drone device, (ii) video signals of nearby airspace, (iii) thermal signals generated from the drone device, (iv) radar detection of aerial speed of the drone device, (v) radiofrequency (RF) detection of oscillation in electronic circuits of the drone device, or (vi) RF communications.

[0009] In some aspects, determining that a drone device is within the predetermined geographic area that surrounds the particular property may include confirming, based on the processing of second data associated with the property, that a drone device exists within the predetermined geographic area that surrounds the particular property. In some aspects, the second data includes video or image data captured by a security camera that is located within a predetermined distance from the particular property.

[0010] In some aspects, determining whether the drone device that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device may include generating an electronic signature that is associated with the drone device that is detected within the predetermined geographic area that surrounds the property.

[0011] In some aspects, determining whether the drone device that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device may include accessing a database storing one or more electronic signatures that are each associated with a respective authorized drone device, and determining whether the generated electronic signature that is associated with the drone device that is detected within the predetermined geographic area that surrounds the property is included in the database storing one or more electronic signatures that are each associated with a respective authorized drone device.

[0012] In some aspects, the operations may include determining that the drone that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device when the generated electronic signature is not included in the database.

[0013] In some aspects, the operations include determining that the drone that is detected within the predetermined geographic area that surrounds the property is an authorized drone device when the generated electronic signature is included in the database.

[0014] In some aspects transmitting a signal indicating the detection of the unauthorized drone device within the predetermined geographic area that surrounds the property may include transmitting a notification to a user device, a monitor control unit, a central alarm station, or a combination thereof, that alerts the user device, the monitor control unit, or the central alarm station server, or a combination therefo, of the presence of the unauthorized drone device within the predetermined geographic area that surrounds the property. In some aspects, the notification may include information that identifies the drone device that is detected within the predetermined geographic area that surrounds the property. In some aspects, the information that identifies the drone device that is detected within the predetermined geographic area that surrounds the property may include a drone device type, a time of detection of the drone device, or both.

[0015] In some aspects, the operations may include evaluating the security threat posed by the drone that is detected within the predetermined geographic area that surrounds the property.

[0016] In some aspects, the operations may include in response to determining that the security threat posed by the drone that is detected within the predetermined geographic area that surrounds the property exceeds a predetermined threshold, transmitting a notification to the central alarm station server.

[0017] In some aspects, the operations may include in response to determining that the security threat posed by the drone that is detected within the predetermined area that surrounds the property does not exceed a predetermined threshold, transmitting a notification to the user device.

[0018] In some aspects, the notification to the monitor control unit includes an instruction that instructs the monitor control unit to initiate a particular action associated with the property.

[0019] In some aspects, the particular action may include lowering one or more shades, turning on one or more lights, turning off one or more lights, closing one or more garage doors, locking one or more doors, or a combination therefo.

[0020] The details of one or more implementations are set forth in the accompanying drawings and the description below. Other features will be apparent from the description and drawings.

DESCRIPTION OF DRAWINGS

[0021] FIG. **1** is a contextual diagram of an example of a system for detecting the presence of a drone device near a property.

[0022] FIG. **2** is another contextual diagram of an example of a system for detecting the presence of a drone device near a property.

[0023] FIG. **3** is a block diagram of an example of a system configured to detect the presence of drones near a property.

[0024] FIG. **4** is a flowchart of an example of a process for detecting the presence of an unauthorized drone device within an airspace near a property.

[0025] FIG. **5** is a flowchart of an example of a process for determining whether a detected drone is an unauthorized drone.

DETAILED DESCRIPTION

[0026] Techniques are described for detecting unauthorized use of drone devices at or near (e.g., within a threshold distance of) private properties where the drone devices may pose public safety and privacy concerns. In some implementations, a drone detection device may be used to detect the presence of unauthorized drone devices at or near a property. In some instances, the drone detection device may be used to monitor personal airspace surrounding a property, detect a drone device within the personal airspace, determine that the detected drone device is unauthorized to be located within the personal airspace, and transmit a signal indicating the detection of the unauthorized drone device within the personal airspace.

[0027] FIG. **1** is a contextual diagram of an example of a system **100** for detecting the presence of a drone device near a property **110**. The system **100** may include, for example, monitor control unit **112**, one or more drone detectors **120**, **121**, **122**, **123**, **124**, **125**, **126**, **127**, **128**, one or more authorized drones **135**, **136**, **137**, **138**, a network **140**, one or more communications links **142**, a monitoring application server (or central alarm station server) **150**, and one or more client devices **160**.

[0028] The contextual diagram of system **100** provides an example of a system that uses multiple drone detectors **120**, **121**, **122**, **123**, **124**, **125**, **126**, **127**, **128** to monitor a predetermined geographic area **114** that surrounds the property **110**. The drone detectors used to monitor the predetermined geographic area **114** surrounding the property **110** may include different types of drone detectors. For example, the drone detectors may include stationary drone detectors that are coupled to one or more portions of the property **110**. Such stationary drone detectors may include a stationary drone detector **122** positioned above a front door of property **110**, a stationary drone detector **123** coupled to the roof of property **110**, a stationary drone detector **124** coupled to the chimney of property **110**. Stationary drone detectors may be strategically placed to monitor a particular portion of the geographic area surrounding the property **110** that is in the vicinity of a respective stationary drone detector. For example, a stationary drone detector **123** can be configured to monitor the portion of the predetermined geographic area **114** that is above the roof of the property **110**. Similarly, a drone detector **122** that is coupled to the property **110** above the front door may be used to monitor for drones in the vicinity of the front door of the property **110**.

[0029] Alternatively, or in addition, one or more stationary drone detectors may be coupled to features of the geographic area **114** surrounding the property **110**. For instance, a stationary drone detector **120** may be positioned on the ground at the west entrance to the property **110** and a stationary drone detector **121** may be positioned on the ground at the east entrance to the property **110**. Such stationary drone detectors **120**, **121** may be used to monitor the portion of the predetermined geographic area **114** that is in the vicinity of the stationary drone detectors in an effort to detect the presence of a drone device as soon as the drone device crosses within a predetermined geographic area **114** of the property **110**. The stationary drone detectors may be coupled to any other feature of the geographic area **114** surrounding the property **110** such as rock formations, trees, or the like. Alternatively, or in addition, such stationary drone detectors may also be coupled to one or more other physical structures that are within the geographic area **114** surrounding the property **110**. Such physical structures may include, for example, a fence, a shed, a barn, a telephone pole, a mailbox, or the like.

[0030] Alternatively, or in addition, the drone detectors of system **100** may utilize one or more flight-enable drones that are equipped with a drone detector. For example, the system **100** may use one or drone detectors **125**, **126**, **127**, **128** that have been mounted to one or more authorized drones **135**, **136**, **137**, **138** to monitor the predetermined geographic area **114** surrounding the property **110**. Equipping a drone device **135**, **136**, **137**, **138** with a drone detector **125**, **126**, **127**, **128** provides the advantage of a mobile drone detector. Such a mobile drone detector may have a dynamic range of surveillance that provides flexibility in monitoring the predetermined geographic area **114** surrounding the property **110**.

[0031] However, the present disclosure need not be limited to flight-enabled drone detectors. For instance, in some implementations, the drone detectors may also be mounted

to non-stationary, land-based drone devices. For instance, a drone detectors may be mounted to an authorized drone device that is capable of moving throughout the geographic area **114** surrounding the property **110** on the ground. Such non-stationary, land-based drone detectors provide a legitimate occupant of the property **110** the ability to dynamically adjust the portions of the property **110** that are monitored. It is contemplated that a particular drone detection system may include any number of drone detectors that are associated with any combination of mobility types including non-mobile drone detectors, drone detectors that are mounted on mobile, flight-enabled drones, drone detectors that are mounted to mobile, land-based drones, or the like.

[0032] Mobile drone detectors such as drone detectors **125**, **126**, **127**, **128** mounted to authorized drone device **135**, **136**, **137**, **138**, respectively, may be configured to pursue and/or engage a detected drone device that has been determined to be unauthorized. For instance, if a drone device that is detected within the predetermined geographic region surrounding property **110** is determined to be unauthorized, the authorized drones **135**, **136**, **137**, **138** may track the unauthorized drone, and use the equipped drone detector to jam the unauthorized drone's signals. Alternatively, or in addition, the authorized drones may take one or more actions to chase the unauthorized drone device away, disable the unauthorized drone, or the like.

[0033] Each of the drone detectors **120**, **121**, **122**, **123**, **124**, **125**, **126**, **127**, **128** may monitor at least a portion of the predetermined geographic area **114** surrounding the property **110**. During the course of such monitoring, a particular drone detector **128** that is mounted to a drone device **138** may detect one or more signals from an unidentified drone device **170**. The detected signals may include, for example, audio signals from drone device propellers, video signals of nearby airspace, image signals of nearby airspace, thermal signals generated from the drone device, radar detection of aerial speed of the drone device, radiofrequency detection of oscillation in electronic circuits of the drone device, or the like. Alternatively, or in addition, the detected signals may include the unidentified drone device's **170** RF communications. For example, the unidentified drone device **170** may communicate with a drone operator, drone base station, or other drone controller. The drone detector **128** may detect the unidentified drone device's **170** use of RF communications, intercept the RF communications, or the like and infer the presence of the unidentified drone device **170**.

[0034] The drone detector **128** may generate a signature for the unidentified drone device **170**. The drone detector **128** may search a database of authorized drones in order to determine if the generated signature is included in the database of authorized drone signatures. In this instance, the drone detector **128** may determine that the unidentified drone device **170** is an unauthorized drone, based at least in part, on a determination of whether the generated signature that is associated with the unidentified drone device is (or is not) included in a database of authorized drone device signatures. In response to determining that the generated signature is not included in the database, the drone detector **128** may transmit one, or multiple, signals via the network **140** using one or more wired, or wireless, communication links **142**. The transmitted signals may include a notification that alerts one or more other parties to the presence of the unauthorized drone. Alternatively, or in addition, the drone detector **128** may engage the unauthorized drone device using one or more of the tactics described herein.

[0035] A drone detector such as drone detector **128** may have a database of authorized drone device signatures stored in the drone detector's onboard memory. However, the present disclosure need not be so limited. Instead, in the same, or other implementations, a drone detector **128** may capture one or more signals associated with an unidentified drone device **170**, and transmit the one or more signals to a server such as a monitoring application server (or central alarm station server) **150**, which may generate a drone device signature, search a database of authorized drone device signatures, and determine whether the unidentified drone device **170** is an authorized or unauthorized drone device. Then, the server may transmit data indicating whether the unidentified drone device **170** is an authorized or unauthorized drone device back to the drone detector **128**. In some implementations, the drone detector **128** may communicate directly with the monitoring application server **150** using the network **140** and one or more wired, or wireless, communication links. Alternatively, or in addition, one or more respective drone detectors may communicate with the monitoring application server **150** via the monitor control unit which may serve as an interface between the monitoring application server **150** and one or more respective drone detectors.

[0036] In some implementations, the drone detector **128** may transmit a notification via the network **140** using one or more communication links **142** to a user device **160** that is associated with a legitimate occupant of the property **110**. The notification, when received and processed by the user device **160**, may result in visual or audio alert (or both) that provides an indication to the legitimate occupant of the property **110** of the existence of the unauthorized drone. The graphical alert may include information identifying the unauthorized drone device **170** and one or more options for responding to the unauthorized drone. The one or more options may include, for example, notifying a central alarm station server, notifying law enforcement, instructing the drone device **138** equipped with the drone detector **128** to engage the unauthorized drone device **170** (e.g., jamming the unauthorized drone, flashing lights at the unauthorized drone, crashing into the unauthorized drone, using water tank/pump/sprayer to spray water on the unauthorized drone, or the like), or the like.

[0037] In the same, or other implementations, a drone device can be dispatched to confront (by, e.g., jamming the unauthorized drone, flashing lights at the unauthorized drone, crashing into the unauthorized drone, using water tank/pump/sprayer to spray water on the unauthorized drone, or the like) an unidentified drone in response to a notification from a drone detector even if the drone device is not equipped with a drone detector. For example, a drone detector may detect the presence of an unidentified drone device, and then determine that the drone device is unauthorized. In response to determining that the drone device is unauthorized, the drone detector may transmit an instruction to a drone base station that initiates deployment of one or more drone devices that can confront the unauthorized drone device. Though the deployed drone may, or may not, include a drone detector, the deployed drone can be sufficiently equipped (e.g., with a jamming device, flashlight, water sprayer, or the like) to confront, disable, chase away, or the like the unauthorized drone device. Though the example

herein includes the drone detector instructing a drone base station to deploy a drone device to confront the unidentified drone device, the present disclosure need not be so limited. Instead, the drone detector may issue such instructions directly to another drone device. Alternatively, or in addition, the drone detector may issue such instructions to a monitoring application server, and then the monitoring application server may transmit an instruction to a drone, drone base station, or the like which triggers the deployment of a drone device to confront the identified drone device.

[0038] Alternatively, or in addition, the drone detector **128** may transmit a notification via the network **140** using one or more communications links **142** to monitor control unit **112**. The notification transmitted to the monitor control unit **112** may include information identifying the unauthorized drone device **170** and one or more instructions that instruct the monitor control unit **112** to initiate one or more actions. The one or more actions may include, for example, lowering one or more window shades, turning on one or more lights, turning off one or more lights, locking one or more doors, activating one or more holograms, or the like. Alternatively, or in addition, the notification from the drone detector **128** may be received by the monitor control unit **112**, and then the monitor control unit can generate an alarm event that is forwarded to the monitoring application server (or central alarm station sever) **250**.

[0039] Alternatively, or in addition, the drone detector **128** may transmit a notification via the network **140** using one or more communications links **142** to the monitoring application server (or central alarm station server) **150**. The notification may include information identifying the unauthorized drone, and a request for assistance in addressing the threat posed by the unauthorized drone. In one implementation, the monitoring application server (or central alarm station server) **150** may initiate a communication to one or more law enforcement agencies based on the received notification. In response, one or more law enforcement officers may deploy to the property **110**.

[0040] In the example of system **100**, one or more unidentified drones **172** may also be traveling overhead of property **110**. However, a drone such as unidentified drone device **172** may not be detected by one or more drone detectors **120**, **121**, **122**, **123**, **124**, **125**, **126**, **127**, **128** if the unidentified drone device **172** is not within the predetermined geographic area **114** that surrounds the property **110**.

[0041] FIG. **2** is another contextual diagram of an example of a system **200** for detecting the presence of a drone device near a property **210** The system **200** may include, for example, monitor control unit **212**, one or more drone detectors **220**, **221**, **222**, **223**, **224**, **225**, an authorized drone **235**, a network **240**, one or more communications links **242**, a monitoring application server (or central alarm station server) **250**, and one or more client devices **260**. The system **200** is substantially similar to the system **100** described with reference to FIG. **1**. However, the system **200** provides an example of communication between drone detectors while monitoring a predetermined geographic area **214** that surrounds the property **210**.

[0042] Multiple drone detectors **220**, **221**, **222**, **223**, **224** may monitor a predetermined geographic area **214** that surrounds the property **210** for the presence of one or more drone devices. In some implementations, each drone detector of the multiple drone detectors **220**, **221**, **222**, **223**, **224** may monitor a particular portion of the predetermined geographic area **214**. Then, once a drone detector **220**, **221**, **222**, **223**, **224** detects the presence of a particular drone, the respective drone detector that detected the drone may communicate with one or more other components of system **200** such as the monitoring control unit **212**, one or more other drone detectors **220**, **221**, **222**, **223**, **224**, **225**, monitoring application server (or central alarm station server) **250**, or a drone base station housing one or more drones (not shown) in an effort to track and identify the detected drone.

[0043] By way of example, at stage A, an unidentified drone device **270** may approach a boundary of the predetermined geographic area **214** that surrounds the property **210** on a flight path **270***a*. Since the unidentified drone device **270** is outside the boundary of the predetermined geographic area **214** that surrounds the property **210** at stage A, the unidentified drone device **270** is not within range of one or more drone detectors **220**, **221**, **222**, **223**, **224**.

[0044] In some implementations, one or more drone detectors may be strategically placed to detect unidentified drones as the drones enter a predetermined geographic area **214** that surrounds the property **210**. For example, at stage B, the unidentified drone device **270** crosses the boundary of the predetermined geographic area **214** that surrounds the property **210**. Upon crossing the boundary of the predetermined geographic area **214**, the drone detector **221** that is strategically placed to detect drones crossing into the predetermined geographic area **214** detects one or more signals from the unidentified drone device **270** using one or more sensors. In some implementations, the drone detector **221** may generate a signature for the unidentified drone, and determine whether the drone device **270** is an authorized drone device as described with respect to system **100** of FIG. **1**. However, in other implementations, the drone detector **221** may notify one or more components of system **200** of the presence of the unidentified drone device **270**.

[0045] For example, the drone detector **221** may transmit a notification to (i) the drone detector **225** that is mounted to a drone device **235**, (ii) the drone device equipped with the drone detector **235**, or (iii) both. At the time of receipt of the instruction, the drone device **235** that is equipped with the drone detector **225** may be located within the property **210**. In addition, in some implementations, the drone detector **221** may also transmit a notification to the monitor control unit **212** with an instruction to open the window **214**. In response to the received instruction, the drone device **235** equipped with the drone detector **225** may navigate **235***a* along a navigational path **235***a* that is selected in an effort to intercept the unidentified drone device **270** through the window opened by the monitor control unit **212** (or through a window, door, vent, or the like htat was previously opened independently of an instruction from the monitor control unit **212**). Use of a drone device **235** equipped with a drone detector **225** to intercept the unidentified drone device **270**, and capture **225***b* additional signal data associated with the unidentified drone device **270** may result in captured signal data that is more accurate. The captured signal data may be more accurate because the drone detector's close proximity to the unidentified drone device may reduce interference associated with the captured signal. Because the captured signal data is more accurate, a drone signature generated based on the more accurate signal data will also have a higher degree of accuracy.

[0046] The drone device **235** may use its equipped drone detector **225** in order to determine whether the unidentified

drone device **270** is an authorized drone device or an unauthorized drone device. For example, at stage C, the drone detector **225** may use one or more onboard sensors to detect one or more signals that are associated with the unidentified drone device **270**. The drone detector **225** may generate a signature for the unidentified drone device **270**. The drone detector **225** may search a database of authorized drones in order to determine if the generated signature is included in the database of authorized drone signatures. In this instance, the drone detector **225** may determine that the unidentified drone device **270** is an unauthorized drone, based at least in part, on a determination of whether the generated signature that is associated with the unidentified drone device is (or is not) included in a database of authorized drone device signatures. In response to determining that the generated signature is not included in the database, the drone detector **225** may transmit one, or multiple, signals via the network **240** using one or more wired, or wireless, communication links **242**. The transmitted signals may include a notification that alerts one or more other parties to the presence of the unauthorized drone. Alternatively, or in addition, the drone detector **225** may engage the unauthorized drone device using one or more of the tactics described herein.

[0047] The implementation of system **200** described with respect to FIG. **2** utilizes communications between drone detectors in an effort to reduce the number of drone detectors mounted to drones flying around the predetermined geographic area **214** that surrounds the property. Such an implementation may facilitate a discrete implementation with ground based sensors scattered through the geographic area **214** surrounding the property **210** that provides the same level of security as the system **100** described with respect to FIG. **1**.

[0048] The aforementioned example describes a scenario where multiple drone detectors communicate directly. However, other implementations may be employed. For instance, upon detection of the unidentified drone device **270** at stage B, the drone detector **221** may transmit signal data associated with the unidentified drone device **270** to the monitor control unit **212**. In such an implementation, the monitor control unit **212** may analyze the received signal data, and determine whether or not to deploy a subsequent drone detector **225** that is mounted to a drone device **235**. If the monitor control unit **212** determines to deploy the drone detector **225**, the monitor control unit **212** may transmit an instruction to (i) the drone detectors **225**, (ii) the drone device **235**, or (iii) both, in order to deploy the drone device **235** equipped with the drone detector **225** to intercept the unidentified drone device **270**.

[0049] In the example of system **200**, one or more unidentified drone **272** may also be traveling overhead of property **210**. However, a drone such as unidentified drone device **272** may not be detected by one or more drone detectors **220**, **221**, **222**, **223**, **224** if the unidentified drone device **172** is not within the predetermined geographic area **214** that surrounds the property **210**.

[0050] In the example of **200**, a drone detector **221** that detects signal data associated with an unidentified drone notifies a drone **235** equipped with a drone detector **225** to deploy from the property **210**. However, it is contemplated that the drone detector **221** could notify other drone devices to respond in the same or similar manner as drone **235** equipped with the drone detector **225**. For instance, the drone detector **221** could notify a drone base station housing one or more drones, and instruct the drone base station to deploy one or more drone devices to confront the unidentified drone device. Alternatively, or in addition, the drone detectors **221** may transmit a similar notification directly to a drone equipped with a drone detector that is already patrolling the airspace associated within predetermined geographic area **214** that surrounds the property **210**. In response to receiving the notification, the deployed drone device that is on patrol may confront the unidentified drone device.

[0051] FIG. **3** illustrates an example of an electronic system **300** configured to detect the presence of drone devices near a property. The electronic system **300** includes a network **305**, a monitor control unit **310**, one or more user devices **340**, **350**, a monitoring application server **360**, a central alarm station server **370**, and one or more drone detectors **380**. In some examples, the network **305** facilitates communications between the monitoring application server **360**, and the central alarm station server **370**.

[0052] The network **305** is configured to enable exchange of electronic communications between devices connected to the network **305**. For example, the network **305** may be configured to enable exchange of electronic communications between the monitoring system control unit **310**, the one or more user devices **340**, **350**, the monitoring application server **160**, and the central alarm station server **370**. The network **305** may include, for example, one or more of the Internet, Wide Area Networks (WANs), Local Area Networks (LANs), analog or digital wired and wireless telephone networks (e.g., a public switched telephone network (PSTN), Integrated Services Digital Network (ISDN), a cellular network, and Digital Subscriber Line (DSL)), radio, television, cable, satellite, or any other delivery or tunneling mechanism for carrying data. Network **305** may include multiple networks or subnetworks, each of which may include, for example, a wired or wireless data pathway. The network **305** may include a circuit-switched network, a packet-switched data network, or any other network able to carry electronic communications (e.g., data or voice communications). For example, the network **305** may include networks based on the Internet protocol (IP), asynchronous transfer mode (ATM), the PSTN, packet-switched networks based on IP, X.25, or Frame Relay, or other comparable technologies and may support voice using, for example, VoIP, or other comparable protocols used for voice communications. The network **305** may include one or more networks that include wireless data channels and wireless voice channels. The network **305** may be a wireless network, a broadband network, or a combination of networks including a wireless network and a broadband network.

[0053] The monitoring system control unit **310** includes a controller **312** and a network module **314**. The controller **312** is configured to control a monitoring system (e.g., a home alarm or security system) that includes the monitoring system control unit **310**. In some examples, the controller **312** may include a processor or other control circuitry configured to execute instructions of a program that controls operation of an alarm system. In these examples, the controller **312** may be configured to receive input from sensors, detectors, or other devices included in the alarm system and control operations of devices included in the alarm system or other household devices (e.g., a thermostat, an appliance, lights, etc.). For example, the controller **312** may be con-

figured to control operation of the network module **314** included in the monitoring system control unit **310**.

[0054] The network module **314** is a communication device configured to exchange communications over the network **305**. The network module **314** may be a wireless communication module configured to exchange wireless communications over the network **305**. For example, the network module **314** may be a wireless communication device configured to exchange communications over a wireless data channel and a wireless voice channel. In this example, the network module **314** may transmit alarm data over a wireless data channel and establish a two-way voice communication session over a wireless voice channel. The wireless communication device may include one or more of a LTE module, a GSM module, a radio modem, cellular transmission module, or any type of module configured to exchange communications in one of the following formats: LTE, GSM or GPRS, CDMA, EDGE or EGPRS, EV-DO or EVDO, UMTS, or IP.

[0055] The network module **314** also may be a wired communication module configured to exchange communications over the network **305** using a wired connection. For instance, the network module **314** may be a modem, a network interface card, or another type of network interface device. The network module **314** may be an Ethernet network card configured to enable the monitoring system control unit **310** to communicate over a local area network and/or the Internet. The network module **314** also may be a voiceband modem configured to enable the alarm panel to communicate over the telephone lines of Plain Old Telephone Systems (POTS).

[0056] The monitoring system that includes the monitoring system control unit **310** includes one or more sensors or detectors. For example, the monitoring system may include multiple sensors **320**. The sensors **320** may include a contact sensor, a motion sensor, a glass break sensor, or any other type of sensor included in an alarm system or security system. The sensors **320** also may include an environmental sensor, such as a temperature sensor, a water sensor, a rain sensor, a wind sensor, a light sensor, a smoke detector, a carbon monoxide detector, an air quality sensor, etc. The sensors **320** further may include a health monitoring sensor, such as a prescription bottle sensor that monitors taking of prescriptions, a blood pressure sensor, a blood sugar sensor, a bed mat configured to sense presence of liquid (e.g., bodily fluids) on the bed mat, etc. In some examples, the sensors **320** may include a radio-frequency identification (RFID) sensor that identifies a particular article that includes a pre-assigned RFID tag.

[0057] The monitoring system control unit **310** communicates with the module **322** and the camera **330** to perform surveillance or monitoring. The module **322** is connected to one or more devices that enable home automation control. For instance, the module **322** may be connected to one or more lighting systems and may be configured to control operation of the one or more lighting systems. Also, the module **322** may be connected to one or more electronic locks at the property and may be configured to control operation of the one or more electronic locks (e.g., control Z-Wave locks using wireless communications in the Z-Wave protocol). Further, the module **322** may be connected to one or more appliances at the property and may be configured to control operation of the one or more appliances. The module **322** may include multiple modules that are each specific to the type of device being controlled in an automated manner. The module **322** may control the one or more devices based on commands received from the monitoring system control unit **310**. For instance, the module **322** may cause a lighting system to illuminate an area to provide a better image of the area when captured by a camera **330**.

[0058] The camera **330** may be a video/photographic camera or other type of optical sensing device configured to capture images. For instance, the camera **330** may be configured to capture images of an area within a building monitored by the monitoring system control unit **310**. The camera **330** may be configured to capture single, static images of the area and also video images of the area in which multiple images of the area are captured at a relatively high frequency (e.g., thirty images per second). The camera **330** may be controlled based on commands received from the monitoring system control unit **310**.

[0059] The camera **330** may be triggered by several different types of techniques. For instance, a Passive Infra-Red (PIR) motion sensor may be built into the camera **330** and used to trigger the camera **330** to capture one or more images when motion is detected. The camera **330** also may include a microwave motion sensor built into the camera and used to trigger the camera **330** to capture one or more images when motion is detected. The camera **330** may have a "normally open" or "normally closed" digital input that can trigger capture of one or more images when external sensors (e.g., the sensors **320**, PIR, door/window, etc.) detect motion or other events. In some implementations, the camera **330** receives a command to capture an image when external devices detect motion or another potential alarm event. The camera **330** may receive the command from the controller **312** or directly from one of the sensors **320**.

[0060] In some examples, the camera **330** triggers integrated or external illuminators (e.g., Infra-Red, Z-wave controlled "white" lights, lights controlled by the module **322**, etc.) to improve image quality when the scene is dark. An integrated or separate light sensor may be used to determine if illumination is desired and may result in increased image quality.

[0061] The camera **330** may be programmed with any combination of time/day schedules, system "arming state", or other variables to determine whether images should be captured or not when triggers occur. The camera **330** may enter a low-power mode when not capturing images. In this case, the camera **330** may wake periodically to check for inbound messages from the controller **312**. The camera **330** may be powered by internal, replaceable batteries if located remotely from the monitoring control unit **310**. The camera **330** may employ a small solar cell to recharge the battery when light is available. Alternatively, the camera **330** may be powered by the controller's **312** power supply if the camera **330** is co-located with the controller **312**.

[0062] In some implementations, the camera **330** communicates directly with the monitoring application server **360** over the Internet. In these implementations, image data captured by the camera **330** does not pass through the monitoring system control unit **310** and the camera **330** receives commands related to operation from the monitoring application server **360**.

[0063] The system **300** further includes one or more drone detectors **380**. The drone detectors **380** may be electronic devices that include sensors to detect the presence of unmanned aerial devices (UADs), such as drone devices.

For instance, the sensors may be capable of detecting various types of signals that are generated from the operation of a drone device such as, for example, audio signals from drone device propellers, video signals of nearby airspace, thermal signals generated from the drone devices, radar detection of aerial speed of drone devices, or radiofrequency (RF) detection of oscillation in electronic circuits of drone devices.

[0064] The one or more drone detectors **380** may be placed within different locations within a property. For example, in some instances, the one or more drone detectors **380** may be placed near boundaries of the properties such that the one or more drone detectors **380** may detect the presence of an unauthorized drone device at or near the property. In some instances, the one or more drone detectors **380** may be placed in different locations. For example, a first drone device may be placed near a north entrance to detect incoming drone devices from the north side of the property and a second drone detector may be placed near a south entrance to detect incoming drone devices from the south side of property. The one or more drone detectors **380** may be placed in the property (e.g., at a garage, a door, or window of the property) or external to the property (e.g., on a roof, chimney, antennae, etc., or in an external housing located on the ground or on a structure).

[0065] The drone detectors **380** may include several hardware components. For example, the drone detectors **380** may include one or more cameras, one or more proximity sensors, one or more microphones, one or more gyroscopes, one or more accelerometers, one or more magnetometers, a global positioning system (GPS) unit, an altimeter, one or more sonar or laser sensors, spectrum analyzers, and/or any other types of sensors that aid in the detection of drone devices at or near the property. The one or more drone detectors **380** may include control processors that process output from the various sensors and control the drone detectors **380** to determine the presence of drone devices at or near the property. In this regard, the control processors detect particular signals that enable the drone detectors to identify a drone device.

[0066] In addition, the one or more drone detectors **380** may store data that describes attributes of the property. For instance, the one or more drone detectors **380** may store a floorplan, a three-dimensional model, and/or a site map of the property that enables the drone detectors **380** to determine the presence of a drone device within a particular location of the property or within a particular external space on or near the property. During initial configuration, the one or more drone detectors **380** may receive the data describing attributes of the property, determine a frame of reference to the data (e.g., a home or reference location in the property), and assess sensor data related to the property based on the frame of reference and the data describing attributes of the property.

[0067] In some examples, the one or more drone detectors **380** may include data capture and recording devices. In these examples, the one or more drone detectors **380** may include one or more cameras, one or more motion sensors, one or more microphones, one or more temperature sensors, one or more humidity sensors, one or more air flow sensors, and/or any other types of sensors that may be useful in capturing monitoring data related to the property and users in the property. For instance, the data capture and recording devices may be used to enhance detection signals of a drone device at or near the property. For example, the one or more temperature sensors may indicate heat signatures associated with the drone device, the one or more air flow sensors may indicate changes aerial signals generated by the drone device, and the one or more microphones may be used to detect harmonic patterns that indicate drone device activity. In some instances, the various signals generated by the different data capture and recording devices may be compared to verify the detection of a drone device at or near the property.

[0068] In some implementations, the one or more drone detectors **380** may include output devices. In these implementations, the one or more drone detectors **380** may include one or more displays, one or more speakers, one or more projectors, and/or any type of output devices that allow the one or more drone detectors **380** to communicate information to a nearby user. The one or more projectors may include projectors that project a two-dimensional image onto a surface (e.g., wall, floor, or ceiling) and/or holographic projectors that project three-dimensional holograms into a nearby space.

[0069] The one or more drone detectors **380** also may include a communication module that enables the one or more drone detectors **380** to communicate with the monitoring system control unit **310**, each other, and/or other devices. The communication module may be a wireless communication module that allows the one or more drone detectors **380** to communicate wirelessly. For instance, the communication module may be a Wi-Fi module that enables the one or more drone detectors **380** to communicate over a local wireless network at the property. The communication module further may be a 900 MHz wireless communication module that enables the one or more drone detectors **380** to communicate directly with the monitoring system control unit **310**. Other types of short-range wireless communication protocols, such as Bluetooth, Bluetooth LE, Zwave, Zigbee, etc., may be used to allow the one or more drone detectors **380** to communicate with other devices in the property.

[0070] The one or more drone detectors **380** further may include processor and storage capabilities. The one or more drone detectors **380** may include any suitable processing devices that enable the one or more drone detectors **380** to operate applications and perform the actions described throughout this disclosure. In addition, the one or more drone detectors **380** may include solid state electronic storage that enables the one or more drone detectors **380** to store applications, configuration data, collected sensor data, and/or any other type of information available to the one or more drone detectors **380**.

[0071] In some implementations, the one or more drone detectors **380** may additionally be used to perform routine surveillance operations on a property. For instance, the one or more drone detectors **380** may be assigned to one or more particular properties within a geographic location and may routinely collect surveillance footage during specified time periods (e.g., after dark), which may then be transmitted to the application server **360** for transmitting back to each particular property owner. In such implementations, the property owner may receive the surveillance footage over the network **305** as a part of a service provided by a security provider that operates the application server **360**. For example, transmissions of the surveillance footage collected

by the one or more drone detectors **380** may be part of a premium security service package provided by a security provider.

[0072] In some implementations, the one or more drone detectors **380** may be drone devices, or placed on drone devices to perform surveillance at or near a property. For example in such implementations, surveillance by the one or more drone detectors **380** may be conducted by particular drone devices that navigate through the property using specific navigation patterns. For instance, initial configuration of the one or more drone detectors **380** may include learning of one or more navigation patterns in which a user provides input to control the one or more drone detectors **380** to perform a specific detection action (e.g., enable a particular detector sensor based on the features of the property). In this regard, the one or more drone detectors **380** may learn and store the navigation patterns such that the one or more drone detectors **380** may automatically repeat the specific navigation actions upon a later request.

[0073] In some implementations where the one or more drone detectors **380** may be drone devices, the monitoring system control unit **310** may monitor operational status of the one or more drone detectors **380** and coordinate further operation based on the operational status. In some implementations, the system **300** allows central station operators, first responders, and/or users of the property to interact with and control the one or more drone detectors **380**. In some examples, the one or more drone detectors **380** may periodically perform test sequences to ensure the one or more drone detectors **380** will operate correctly if needed. The monitoring system control unit **310** also may arrange the test sequences to occur during periods of time that are convenient for users of the property. For example, the monitoring system control unit **310** may assess sensor data at the property and determine a time period in which the property is unoccupied and unlikely to be occupied until the test sequences complete. In this example, the monitoring system control unit **310** waits until the preferred time period to initiate test sequences for one or more of the one or more drone detectors **380**.

[0074] The sensors **320**, the module **322**, the camera **330**, and the one or more drone detectors **380** communicate with the controller **312** over communication links **324**, **326**, **328**, and **384**, respectively. The communication links **324**, **326**, **328**, and **384** may be a wired or wireless data pathway configured to transmit signals from the sensors **320**, the module **322**, the camera **330**, and the one or more drone detectors **380** to the controller **312**. The sensors **320**, the module **322**, the camera **330**, and the one or more drone detectors **380** may continuously transmit sensed values to the controller **312**, periodically transmit sensed values to the controller **312**, or transmit sensed values to the controller **312** in response to a change in a sensed value.

[0075] The communication links **324**, **326**, **328**, and **384** may include a local network. The sensors **320**, the module **322**, the camera **330**, and the one or more drone detectors **180** and the controller **312** may exchange data and commands over the local network. The local network may include 802.11 "WiFi" wireless Ethernet (e.g., using low-power WiFi chipsets), Z-Wave, Zigbee, Bluetooth, "Homeplug" or other "Powerline" networks that operate over AC wiring, and a Category 5 (CATS) or Category 6 (CAT6) wired Ethernet network. The local network may be a mesh network constructed based on the devices connected to the mesh network.

[0076] The monitoring application server **360** is an electronic device configured to provide monitoring services by exchanging electronic communications with the monitoring system control unit **310**, the one or more user devices **340**, **350**, and the central alarm station server **370** over the network **305**. For example, the monitoring application server **360** may be configured to monitor events (e.g., alarm events, detection of drone devices) generated by the monitoring system control unit **310**. In this example, the monitoring application server **360** may exchange electronic communications with the network module **314** included in the monitoring system control unit **310** to receive information regarding events (e.g., alarm events) detected by the monitoring system control unit **310**. The monitoring application server **360** also may receive information regarding events (e.g., alarm events) from the one or more user devices **340**, **350**.

[0077] In some examples, the monitoring application server **360** may route alarm data received from the network module **314** or the one or more user devices **340**, **350** to the central alarm station server **370**. For example, the monitoring application server **360** may transmit the alarm data to the central alarm station server **370** over the network **305**.

[0078] The monitoring application server **360** may store sensor and image data received from the monitoring system and perform analysis of sensor and image data received from the monitoring system. Based on the analysis, the monitoring application server **360** may communicate with and control aspects of the monitoring system control unit **310** or the one or more user devices **340**, **350**.

[0079] The central alarm station server **370** is an electronic device configured to provide alarm monitoring service by exchanging communications with the monitoring system control unit **310**, the one or more mobile devices **340**, **350**, and the monitoring application server **360** over the network **305**. For example, the central alarm station server **370** may be configured to monitor alarm events generated by the monitoring system control unit **310**. In this example, the central alarm station server **370** may exchange communications with the network module **314** included in the monitoring system control unit **310** to receive information regarding alarm events detected by the monitoring system control unit **310**. The central alarm station server **370** also may receive information regarding alarm events from the one or more mobile devices **340**, **350** and/or the monitoring application server **360**.

[0080] The central alarm station server **370** is connected to multiple terminals **372** and **374**. The terminals **372** and **374** may be used by operators to process alarm events. For example, the central alarm station server **370** may route alarm data to the terminals **372** and **374** to enable an operator to process the alarm data. The terminals **372** and **374** may include general-purpose computers (e.g., desktop personal computers, workstations, or laptop computers) that are configured to receive alarm data from a server in the central alarm station server **370** and render a display of information based on the alarm data. For instance, the controller **312** may control the network module **314** to transmit, to the central alarm station server **370**, alarm data indicating that a sensor **320** detected a door opening when the monitoring system was armed. The central alarm station server **370** may receive the alarm data and route the alarm data to the terminal **372**

for processing by an operator associated with the terminal **372**. The terminal **372** may render a display to the operator that includes information associated with the alarm event (e.g., the name of the user of the alarm system, the address of the building the alarm system is monitoring, the type of alarm event, etc.) and the operator may handle the alarm event based on the displayed information.

[0081] In some implementations, the terminals **372** and **374** may be mobile devices or devices designed for a specific function. Although FIG. **3** illustrates two terminals for brevity, actual implementations may include more (and, perhaps, many more) terminals.

[0082] In some implementations, the central alarm station server **370** may exchange communications with an emergency service provider to transmit alarm signal data indicating an alarm event taking place within a property where the monitor control unit **310** may be located. For instance, the central alarm station **370** may transmit incident reports in response to the monitor control unit **310** detecting an alarm event where a user requires emergency assistance. In such instances, the central alarm stations server **370** may be an electronic device that communicates essential safety information to an emergency responder such as an emergency medial responder, a fire department, or a public safety access point.

[0083] In some implementations, the central alarm station server **370** may be a third party entity separate from the monitoring application server **360**. For example, the central alarm station server **370** may be a central alarm station for a security service provider, a campus security server in a school or school/university police department, or security gateway for a particular residential neighborhood. For instance, the central alarm station server **370** may be registered to the system **300** using a connection bridge such as the application (e.g., the native surveillance application **342**), using a unique user identifier such as a username and password or a Quick Response (QR). In other instances, the central alarm station server **370** may be registered to users within a particular geographic location (e.g., a gated residential community) where users within the geographical location are registered to a particular central alarm station server **370** and a particular monitoring application server **360** of the particular location.

[0084] The one or more user devices **340**, **350** are devices that host and display user interfaces. For instance, the user device **340** is a mobile device that hosts one or more native applications (e.g., the native surveillance application **342**). The user device **340** may be a cellular phone or a non-cellular locally networked device with a display. The user device **340** may include a cell phone, a smart phone, a tablet PC, a personal digital assistant ("PDA"), or any other portable device configured to communicate over a network and display information. For example, implementations may also include Blackberry-type devices (e.g., as provided by Research in Motion), electronic organizers, iPhone-type devices (e.g., as provided by Apple), iPod devices (e.g., as provided by Apple) or other portable music players, other communication devices, and handheld or portable electronic devices for gaming, communications, and/or data organization. The user device **340** may perform functions unrelated to the monitoring system, such as placing personal telephone calls, playing music, playing video, displaying pictures, browsing the Internet, maintaining an electronic calendar, etc.

[0085] The user device **340** includes a native surveillance application **342**. The native surveillance application **342** refers to a software/firmware program running on the corresponding mobile device that enables the user interface and features described throughout. The user device **340** may load or install the native surveillance application **342** based on data received over a network or data received from local media. The native surveillance application **342** runs on mobile devices platforms, such as iPhone, iPod touch, Blackberry, Google Android, Windows Mobile, etc. The native surveillance application **342** enables the user device **340** to receive and process image and sensor data from the monitoring system.

[0086] The user device **350** may be a general-purpose computer (e.g., a desktop personal computer, a workstation, or a laptop computer) that is configured to communicate with the monitoring application server **360** and/or the monitoring system control unit **310** over the network **305**. The user device **350** may be configured to display a surveillance monitoring user interface **352** that is generated by the user device **350** or generated by the monitoring application server **360**. For example, the user device **350** may be configured to display a user interface (e.g., a web page) provided by the monitoring application server **360** that enables a user to perceive images captured by the camera **330** and/or reports related to the monitoring system. Although FIG. **3** illustrates two user devices for brevity, actual implementations may include more (and, perhaps, many more) or fewer user devices.

[0087] In some implementations, the one or more user devices **340**, **350** communicate with and receive monitoring system data from the monitoring system control unit **310** using the communication link **338**. For instance, the one or more user devices **340**, **350** may communicate with the monitoring system control unit **310** using various local wireless protocols such as wifi, Bluetooth, zwave, zigbee, HomePlug (ethernet over powerline), or wired protocols such as Ethernet and USB, to connect the one or more user devices **340**, **350** to local security and automation equipment. The one or more user devices **340**, **350** may connect locally to the monitoring system and its sensors and other devices. The local connection may improve the speed of status and control communications because communicating through the network **305** with a remote server (e.g., the monitoring application server **360**) may be significantly slower.

[0088] Although the one or more user devices **340**, **350** are shown as communicating with the monitoring system control unit **310**, the one or more user devices **340**, **350** may communicate directly with the sensors and other devices controlled by the monitoring system control unit **310**. In some implementations, the one or more user devices **340**, **350** replace the monitoring system control unit **310** and perform the functions of the monitoring system control unit **310** for local monitoring and long range/offsite communication.

[0089] In other implementations, the one or more user devices **340**, **350** receive monitoring system data captured by the monitoring system control unit **310** through the network **305**. The one or more user devices **340**, **350** may receive the data from the monitoring system control unit **310** through the network **305** or the monitoring application server **360** may relay data received from the monitoring system control unit **310** to the one or more user devices **340**,

350 through the network 305. In this regard, the monitoring application server 360 may facilitate communication between the one or more user devices 340, 350 and the monitoring system.

[0090] In some implementations, the one or more user devices 340, 350 may be configured to switch whether the one or more user devices 340, 350 communicate with the monitoring system control unit 310 directly (e.g., through link 338) or through the monitoring application server 360 (e.g., through network 305) based on a location of the one or more user devices 340, 350. For instance, when the one or more user devices 340, 350 are located close to the monitoring system control unit 310 and in range to communicate directly with the monitoring system control unit 310, the one or more user devices 340, 350 use direct communication. When the one or more user devices 340, 350 are located far from the monitoring system control unit 310 and not in range to communicate directly with the monitoring system control unit 310, the one or more user devices 340, 350 use communication through the monitoring application server 360.

[0091] Although the one or more user devices 340, 350 are shown as being connected to the network 305, in some implementations, the one or more user devices 340, 350 are not connected to the network 305. In these implementations, the one or more user devices 340, 350 communicate directly with one or more of the monitoring system components and no network (e.g., Internet) connection or reliance on remote servers is needed.

[0092] In some implementations, the one or more user devices 340, 350 are used in conjunction with only local sensors and/or local devices in a house. In these implementations, the system 100 only includes the one or more user devices 340, 350, the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380. The one or more user devices 340, 350 receive data directly from the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380 and sends data directly to the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380. The one or more user devices 340, 350 provide the appropriate interfaces/processing to provide visual surveillance and reporting.

[0093] In other implementations, the system 300 further includes network 305 and the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380 are configured to communicate sensor and image data to the one or more user devices 340, 350 over network 305 (e.g., the Internet, cellular network, etc.). In yet another implementation, the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380 (or a component, such as a bridge/router) are intelligent enough to change the communication pathway from a direct local pathway when the one or more user devices 340, 350 are in close physical proximity to the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380 to a pathway over network 305 when the one or more user devices 340, 350 are farther from the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380. In some examples, the system leverages GPS information from the one or more user devices 340, 350 to determine whether the one or more user devices 340, 350 are close enough to the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380 to use the direct local pathway or whether the one or more user devices 340, 350 are far enough from the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380 that the pathway over network 305 is required. In other examples, the system leverages status communications (e.g., pinging) between the one or more user devices 340, 350 and the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380 to determine whether communication using the direct local pathway is possible. If communication using the direct local pathway is possible, the one or more user devices 340, 350 communicate with the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380 using the direct local pathway. If communication using the direct local pathway is not possible, the one or more user devices 340, 350 communicate with the sensors 320, the module 322, the camera 330, and the one or more drone detectors 380 using the pathway over network 305.

[0094] In some implementations, the system 300 provides end users with access to images captured by the camera 330 to aid in decision making. The system 300 may transmit the images captured by the camera 330 over a wireless WAN network to the user devices 340, 350. Because transmission over a wireless WAN network may be relatively expensive, the system 300 uses several techniques to reduce costs while providing access to significant levels of useful visual information.

[0095] In some implementations, a state of the monitoring system and other events sensed by the monitoring system may be used to enable/disable video/image recording devices (e.g., the camera 330). In these implementations, the camera 330 may be set to capture images on a periodic basis when the alarm system is armed in an "Away" state, but set not to capture images when the alarm system is armed in a "Stay" state or disarmed. In addition, the camera 330 may be triggered to begin capturing images when the alarm system detects an event, such as an alarm event, a door opening event for a door that leads to an area within a field of view of the camera 330, or motion in the area within the field of view of the camera 330. In other implementations, the camera 330 may capture images continuously, but the captured images may be stored or transmitted over a network when needed.

[0096] Further, in some implementations, the system 300 intelligently leverages the one or more drone detectors 380 to aid in security monitoring, property automation, and property management. For example, the one or more drone detectors 380 may aid in investigating alarm events detected at the property by the monitoring system control unit 310. In this example, the monitoring system control unit 310 may detect an alarm event (e.g., a fire alarm, an entry into the property when the system is armed "Stay," etc.) and, based on the detected alarm event, control the one or more drone detectors 380 to attempt to identify drones devices at or near the property at the time of the alarm event. Specifically, the monitoring system control unit 310 may send a control command to each of the one or more drone detectors 380 that causes the one or more drone detectors 380 to perform a coordinated and automated search for drone devices at or near the property. Based on the control command received, each of the one or more drone detectors 380 begins navigating the property and captures images of the property while navigating. Each of the one or more drone detectors 380 may execute a predefined navigation pattern at or near the property or the one or more drone detectors 380 may

execute a coordinated scan of the property in which the one or more drone detectors **380** exchange location information and navigate to areas that have not been explored by one of the other devices.

[0097] In some examples, the one or more drone detectors **380** may analyze the images captured during the scan of the property for the presence of drone devices in the captured images. For instance, the one or more drone detectors **380** may use image processing techniques in an attempt to identify shapes in the captured images that resemble a drone device. The one or more drone detectors **380** also may analyze the images for moving objects (or use other techniques to identify moving objects) and target imaging on capture of moving objects.

[0098] Based on detection of a drone device or another type of moving object, the one or more drone detectors **380** may lock onto the drone device and follow the drone device throughout the property. In this regard, the one or more drone detectors **380** may track the movement of the drone device throughout the property and capture images of the movement. In addition, once one of the one or more drone detectors **380** locks onto a drone device, the one or more drone detectors **380** coordinate to ensure that multiple of the one or more drone detectors **380** do not lock onto the same drone device. The coordination may be direct amongst the one or more drone detectors **380** and/or through the monitoring system control unit **310**. The coordination may involve sharing the location of the drone device. Based on the shared location and attributes, the one or more drone detectors **380** may determine whether multiple drone detectors **180** have locked onto the same drone device and take action accordingly.

[0099] In some examples, the one or more drone detectors **380** perform image recognition processing on the one or more images in an attempt to detect whether any identified drone devices are legitimate access to the property. In these examples, the one or more drone detectors **380** may have access to access lists of legitimate drone devices (e.g., drone devices provided as part of a security service) that may enter the property and may compare images being captured to the accessed images of legitimate drone devices. Based on the comparison, the one or more drone detectors **380** may determine whether the imaged drone devices match a legitimate drone device of the property. For example, the drone detectors **380** use electronic signature recognition techniques, based on an identified RF signal, to determine whether the imaged drone devices matches a legitimate drone device of the property. The one or more drone detectors **380** then use the determination of whether the imaged drone device matches a legitimate drone device of the property to control further tracking operations.

[0100] For example, based on a determination that the imaged drone device is an unauthorized electronic device, the one or more drone detectors **380** may continue tracking the drone device and ensure that images sufficient to identify the drone device have been captured. In this example, the one or more drone detectors **380** may attempt to capture electronic signature data from the unauthorized drone device, such as hardware identifiers, RF signal data, and/or heat signatures of the unauthorized drone device. In addition, the one or more drone detectors **380** may take action to thwart the intrusion by the unauthorized drone device. For example, the one or more drone detectors **380** may transmit a signal to another electronic device at or near the property (e.g., a drone device) to initiate a detection signal of the unauthorized drone device, play loud sounds near the unauthorized drone device, shine lights near the unauthorized drone device, output identifying information collected about the unauthorized drone device (e.g., electronic signatures, captured images, etc.), alert a central station operator or first responder about the intrusion, and may take other actions directed to disrupting the unauthorized drone device.

[0101] Alternatively, based on a determination that the imaged drone device is a legitimate drone device, the one or more drone detectors **380** may discontinue tracking the legitimate drone device and scan for unauthorized drone devices. The one or more drone detectors **380** also may report the location of the legitimate drone device. The one or more drone detectors **380** further may continue tracking the legitimate drone device and attempt to provide assistance to the drone device. For instance, if the alarm is a fire alarm event, the one or more drone detectors **380** may continuously or periodically update the location of the legitimate drone device to assist another drone devices or first responders in assisting the legitimate drone device, provide audible reminders of what types of actions should be taken in a fire, enable a central station operator or first responder to talk to the legitimate user through a two-way voice communication session established through the monitoring system control unit **310** and the drone device.

[0102] In some examples, the one or more drone detectors **380** may be assigned to different areas of the property where the one or more drone detectors **380** can monitor airspace in an unobstructed manner. In these examples, the one or more drone detectors **380** may be assigned to different levels in a property (e.g., a front entrance drone detector and a back entrance drone detector) and even different rooms or sections that are potentially blocked by doors. The monitoring system control unit **310** coordinates tracking based on the assigned areas. For instance, the monitoring system control unit **310** determines areas in or near a property where an event has been detected (e.g., where motion is sensed, where a door or window is opened, etc.) and only controls the devices assigned to the determined areas to operate. In this regard, the monitoring system control unit **310** may use location of users determined using sensors to control operation of the one or more drone detectors **380**.

[0103] In some implementations, after detecting a drone device at or near the property, the one or more drone detectors **380** may actively impede the operation of the drone device at or near the property. For example, in some instances, in response to detecting the drone device, the one or more drone detectors **380** may enable a RF jamming signal, generate a laser or light signal to impede the detected drone device from navigating at or near the property, generate a blinding light to reduce visibility of the property, or enable an alarm signal to prevent further trespass. In other examples, the one or more drone detectors **380** may transmit signals to the monitor control unit **310** to enable particular actions at or near the property (e.g., lower the shades, close garage door, lock doors, etc.).

[0104] FIG. **4** illustrates an example process **400** for detecting the presence of an unauthorized drone device within an airspace near a property. Briefly, the process **400** may include monitoring personal airspace surrounding a property (**410**), detecting a drone device within the personal airspace (**420**), determining that the detected drone device is unauthorized to be located within the personal airspace

(**430**), and transmitting a signal indicating the detection of the unauthorized drone device within the personal airspace (**440**).

[0105] In more detail, the process **400** may include monitoring personal airspace surrounding a property (**410**). For example, the one or more drone detectors **380** may monitor personal airspace surrounding a property where the electronic system **300** is located. The one or more drone detectors **380** may be configured to capture sensor data from the personal airspace surrounding the property and monitor the captured sensor data for activity. For instance, the one or more drone detectors **380** may monitor particular frequency ranges that correspond to electronic signals generated by drone devices. In other instances, the one or more drone detectors **380** may monitor other types of signals such, for example, RF signals, video signals, audio signals, or thermal signatures that may be generated by drone devices.

[0106] The process **400** may include detecting a drone device within the personal airspace (**420**). For example, the one or more drone detectors **380** may detect the presence of a drone device within the airspace of the property. For instance, as discussed previously with respect to FIG. **3**, the one or more drone detectors **380** may detect various types of signals that are generated from the operation of a drone device such as, for example, audio signals from drone device propellers, video signals of nearby airspace, thermal signals generated from the drone devices, radar detection of aerial speed of drone devices, or radiofrequency (RF) detection of oscillation in electronic circuits of drone devices. For instance, the one or more drone detectors **380** may analyze sound input for harmonics produced by drone devices for detection, and in response to detecting the drone devices, exchange communications with the sensors **320**. For example, the one or more drone detectors **380** may detect sound generated by a nearby drone device and confirm the detection by accessing video or image data from to a security camera at or near the property. In other example, the one or more drone detectors **380** may monitor a Bluetooth signal of a drone device at or near the property and in response to detecting the drone device, exchange communications with the sensors **320**.

[0107] The process **400** may include determining that the detected drone device is unauthorized within the personal airspace (**430**). For example, the one or more drone detectors **380** may determine that the detected drone device is an unauthorized drone device based on determining the signal from the drone device indicates that the drone device does not have the authority to enter the airspace of the property.

[0108] In some instances, the one or more drone detectors **380** may generate a signature for the detected drone device based on the signals collected by the one or more drone detectors **380**. The signature for the detected drone device may then be compared against a repository of authorized devices that includes an access control list for various electronic devices that have been authorized by the property owner to enter the airspace of the property. For example, the repository of authorized devices may include signatures associated with drone devices that are owned by the property owner, drone devices that are provided as part of a security service by a security provider, and/or associated drone devices that have previously entered the airspace of the property. In such instances, the one or more drone detectors **380** may compare the signature of the detected drone device to signatures included in the repository of authorized devices, and, in response to determining that the signature is not included in the repository of authorized devices, determine that the detected drone device is an unauthorized drone device.

[0109] In some implementations, determining whether a detected drone is an authorized or unauthorized drone may include evaluating a set of one or more permissions associated with an access control list. The access control list associated with a drone may indicate that a drone has a limited type of access to the property. For example, a drone may be authorized during a first part of a day (e.g., nighttime) but not during a second part of the day (e.g., daytime). Alternatively, or in addition, for example, a drone may be authorized to fly over the property from above a predetermined altitude. However, if the drone flies lower than the predetermined altitude, the drone becomes unauthorized. Accordingly, though some implementations merely determine whether a detected drone is authorized or unauthorized based on whether the detected drone's signature is in a database of authorized drones, other implementations determine whether a drone is authorized differently (e.g., by analyzing the drone's actions in view of a drone access control list).

[0110] The process **400** may include transmitting a signal indicating the detection of the unauthorized drone device within the personal airspace (**440**). For example, in response to the one or more drone detectors **380** detecting an unauthorized drone device, the one or more drone detectors **380** may transmit a signal to either the user devices **340**, **350**, monitor control unit **310**, the monitoring application server **360**, or the central alarm station server **370**. For instance, the one or more drone detectors **380** may initially determine the security threat posed by the detected unauthorized drone device, and transmit the signal accordingly. For example, if there is a high security threat posed by the detected unauthorized device, then the one or more drone detectors **380** may transmit the signal to the central alarm station server **370**. In another example, if there is a low security threat posed by the detected unauthorized device, then the one or more drone detectors **180** may transmit the signal to the user devices **340**, **350**.

[0111] In other instances, the one or more drone detectors **380** may transmit the signal to both the user devices **340**, **350** and the central alarm station server **370**. For example, the signal may include a text notification to the user devices **340**, **350** or the central alarm station server **370** that includes information such as device type, time of detection, or other types of identifying information associated with the detected unauthorized device. In some instances, the notification may additionally or alternatively include information related to the severity of the security breach posed by the unauthorized device so that a property user may take action in response to receiving the notification on the user devices **340**, **350**. For example, the user may receive options to contact a security provider, enable particular features of the system **300** such as enabling the sensors **320** to collect footage, close the windows or lock the front door. In other examples, the user may receive options to contact local law enforcement agencies to report a potential trespass by the detected unauthorized device.

[0112] FIG. **5** is a flowchart of an example of a process **500** for determining whether a detected drone is an unauthorized drone. Briefly, the process **500** may include obtaining one or more signals that are associated with a drone (**510**), gener-

ating a signature for the detected drone (**520**), determining whether the signature for the detected drone is included in a repository of authorized drone devices (**530**), and providing an indication of whether or not the detected drone is an unauthorized drone (**540**).

[0113] The process **500** begins by obtaining **510** one or more signals that are associated with a drone that is detected within a predetermined geographic area that surrounds a property. In one implementation, the property may include a house, building, or other structure. The predetermined geographic area that surrounds the property may include, for example, a geographic area that spans a predetermined threshold distance from the property. The predetermined threshold distance may be based on a set of one or more boundary lines such as, for example, the boundary lines established by a land deed associated with the property. Alternatively, the predetermined threshold distance may include for example, a particular distance that extends from one or more portions of the property in multiple directions (including skyward). For instance, the predetermined threshold distance may be a predetermined 5 meters, 10 meters, 15 meters, or the like from each portion of the property (including skyward). One or more different types of signals that are associated with the drone that is detected within a predetermined geographic region that surrounds a property may be obtained at stage **510**. For example, the obtained signals may include audio signals from drone device propellers, video signals of nearby airspace, image signals of nearby airspace, thermal signals generated from the drone device, radar detection of aerial speed of the drone device, radiofrequency detection of oscillation in electronic circuits of the drone device, RF communications to and from the drone device, or the like.

[0114] The process may continue by generating **520** a signature for the drone that was detected within a predetermined geographic area that surrounds a property. The signature may be based on a representation of the one or more obtained signals that are associated with the detected drone. In one implementation, a particular signal of the one or more signals may be used to generate a signature for the drone that was detected within a predetermined geographic area that surrounds the property. Alternatively, a collection of two or more signals may be used to generate a signature for the drone that was detected within a predetermined geographic area that surrounds the property. The one or more signals may include, for example, one or more of the signals obtained in stage **510**. The generated signature that is based on the one or more signals that are associated with the detected drone may function as a unique identifier that distinguishes the detected drone device from other drone devices.

[0115] The process may continue by determining **530** whether the generated signature for the drone device that was detected within the predetermined geographic area that surrounds the property is associated with an authorized drone device. Determining whether the generated signature for the detected drone device is associated with an authorized drone device may include, for example, accessing a database of authorized drone device signatures. The database of authorized drone device signatures may be maintained by a legitimate occupant of the property, a security services provider, law enforcement, or the like using one or more computers and may include a signature for each drone that is authorized to enter the predetermined geographic area that surrounds the property. A search of the database of authorized drone device signatures may be performed based on the generated drone device signature. If it is determined that the generated signature of the drone device is included in the database of authorized drone device signatures, then it may be determined that the detected drone that is associated with the generated signature is an authorized drone. In such instances, the security monitoring system may take no further action regarding surveillance of the drone. Alternatively, if it is determined that the generated signature of the drone device is not included in the database of authorized drone device signatures, then it may be determined that the detected drone that is associated with the generated signature is an unauthorized drone. In some implementations, a determination of whether or not a drone device is authorized may include evaluating the drone's actions in view of one or more permissions in the drone's access control list (which may be stored in the database of authorized drone device signatures, or a different database).

[0116] The process may continue by providing **540** an indication as to whether or not the drone that was detected within a predetermined geographic area of the property is an unauthorized drone device. For example, if it is determined that the generated signature that is associated with the detected drone is not in the database of authorized drones, then an instruction may be generated that instructs the drone detector that detected the unauthorized drone to transmit a signal to a user device, monitor control unit, a central alarm station server, or the like indicating that an unauthorized drone has been detected within a predetermined geographic area of the property. Alternatively, if it is determined that the generated signature that is associated with the detected drone is in the database of authorized drones, then an instruction may be generated that instructs the drone detector that detected the authorized drone that a communication to a user device, monitor control unit, central alarm station or the like is discretionary, since the detected drone is an authorized drone. However, in some implementations, a drone detection device may still transmit a notification to a user device, monitor control unit, central alarm station server, or the like that alerts the user device, monitor control unit, central alarm station server, or the like to the presence of authorized drones. For instance, a user device, monitor control unit, central alarm stations server, or the like may maintain a map includes data points that represent each of the drones that are detected within a predetermined geographic distance of a property regardless of whether the detected drones are authorized or unauthorized.

[0117] The described systems, methods, and techniques may be implemented in digital electronic circuitry, computer hardware, firmware, software, or in combinations of these elements. Apparatus implementing these techniques may include appropriate input and output devices, a computer processor, and a computer program product tangibly embodied in a machine-readable storage device for execution by a programmable processor. A process implementing these techniques may be performed by a programmable processor executing a program of instructions to perform desired functions by operating on input data and generating appropriate output. The techniques may be implemented in one or more computer programs that are executable on a programmable system including at least one programmable processor coupled to receive data and instructions from, and to transmit data and instructions to, a data storage system, at

least one input device, and at least one output device. Each computer program may be implemented in a high-level procedural or object-oriented programming language, or in assembly or machine language if desired; and in any case, the language may be a compiled or interpreted language. Suitable processors include, by way of example, both general and special purpose microprocessors. Generally, a processor will receive instructions and data from a read-only memory and/or a random access memory. Storage devices suitable for tangibly embodying computer program instructions and data include all forms of non-volatile memory, including by way of example semiconductor memory devices, such as Erasable Programmable Read-Only Memory (EPROM), Electrically Erasable Programmable Read-Only Memory (EEPROM), and flash memory devices; magnetic disks such as internal hard disks and removable disks; magneto-optical disks; and Compact Disc Read-Only Memory (CD-ROM). Any of the foregoing may be supplemented by, or incorporated in, specially designed application-specific integrated circuits (ASICs).

[0118] It will be understood that various modifications may be made. For example, other useful implementations could be achieved if steps of the disclosed techniques were performed in a different order and/or if components in the disclosed systems were combined in a different manner and/or replaced or supplemented by other components. Accordingly, other implementations are within the scope of the disclosure. cm What is claimed is:

1. An device, comprising:
a network interface;
one or more sensors;
one or more processors; and
one or more storage devices that include instructions that are operable, when executed by the one or more processors, to cause the one or more processors to perform operations comprising:
monitoring a predetermined geographic area that surrounds a particular property;
determining that a drone device is within the predetermined geographic area that surrounds the particular property;
determining whether the drone device that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device; and
in response to determining that the drone device that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device, transmitting a signal indicating the detection of the unauthorized drone device within the predetermined geographic area that surrounds the property.

2. The device of claim **1**, wherein the predetermined geographic area that surrounds a particular property includes the airspace that surrounds the property.

3. The device of claim **1**, wherein the predetermined geographic area that surrounds the particular property includes a geographic area that spans a predetermined threshold distance from the particular property.

4. The device of claim **1**, wherein monitoring a predetermined geographic area that surrounds a particular property includes:
capturing sensor data that is output from at least one of the one or more sensors.

5. The device of claim **1**, wherein determining that a drone device is within the predetermined geographic area that surrounds the particular property includes:
determining, based on the detection of first data that includes one or more sensor signals, that a drone device is within the predetermined geographic area that surrounds the particular property, wherein the one or more sensor signals include (i) audio signals from a propeller of the drone device, (ii) video signals of nearby airspace, (iii) thermal signals generated from the drone device, (iv) radar detection of aerial speed of the drone device, (v) radiofrequency (RF) detection of oscillation in electronic circuits of the drone device, or (vi) RF communications.

6. The device of claim **5**, wherein determining that a drone device is within the predetermined geographic area that surrounds the particular property further includes:
confirming, based on the processing of second data associated with the property, that a drone device exists within the predetermined geographic area that surrounds the particular property.

7. The device of claim **5**, wherein the second data includes video or image data captured by a security camera that is located within a predetermined distance from the particular property.

8. The device of claim **1**, wherein determining whether the drone device that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device includes:
generating an electronic signature that is associated with the drone device that is detected within the predetermined geographic area that surrounds the property.

9. The device of claim **8**, wherein determining whether the drone device that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device includes:
accessing a database storing one or more electronic signatures that are each associated with a respective authorized drone device; and
determining whether the generated electronic signature that is associated with the drone device that is detected within the predetermined geographic area that surrounds the property is included in the database storing one or more electronic signatures that are each associated with a respective authorized drone device.

10. The device of claim **9**, the operations further comprising:
determining that the drone that is detected within the predetermined geographic area that surrounds the property is an unauthorized drone device when the generated electronic signature is not included in the database.

11. The device of claim **9**, the operations further comprising:
determining that the drone that is detected within the predetermined geographic area that surrounds the property is an authorized drone device when the generated electronic signature is included in the database.

12. The device of claim **1**, wherein transmitting a signal indicating the detection of the unauthorized drone device within the predetermined geographic area that surrounds the property includes:
transmitting a notification to a user device, a monitor control unit, a central alarm station, or a combination thereof, that alerts the user device, the monitor control

unit, or the central alarm station server, or a combination therefo, of the presence of the unauthorized drone device within the predetermined geographic area that surrounds the property.

13. The device of claim **12**, wherein the notification includes information that identifies the drone device that is detected within the predetermined geographic area that surrounds the property.

14. The device of claim **13**, wherein the information that identifies the drone device that is detected within the predetermined geographic area that surrounds the property includes a drone device type, a time of detection of the drone device, or both.

15. The device of claim **12**, the operations further comprising:

evaluating the security threat posed by the drone that is detected within the predetermined geographic area that surrounds the property.

16. The device of claim **15**, the operations further comprising:

in response to determining that the security threat posed by the drone that is detected within the predetermined geographic area that surrounds the property exceeds a predetermined threshold, transmitting a notification to the central alarm station server.

17. The device of claim **16**, the operations further comprising:

in response to determining that the security threat posed by the drone that is detected within the predetermined area that surrounds the property does not exceed a predetermined threshold, transmitting a notification to the user device.

18. The device of claim **12**, wherein the notification to the monitor control unit includes an instruction that instructs the monitor control unit to initiate a particular action associated with the property.

19. The device of claim **18**, wherein the particular action includes lowering one or more shades, turning on one or more lights, turning off one or more lights, closing one or more garage doors, locking one or more doors, or a combination therefo.

* * * * *